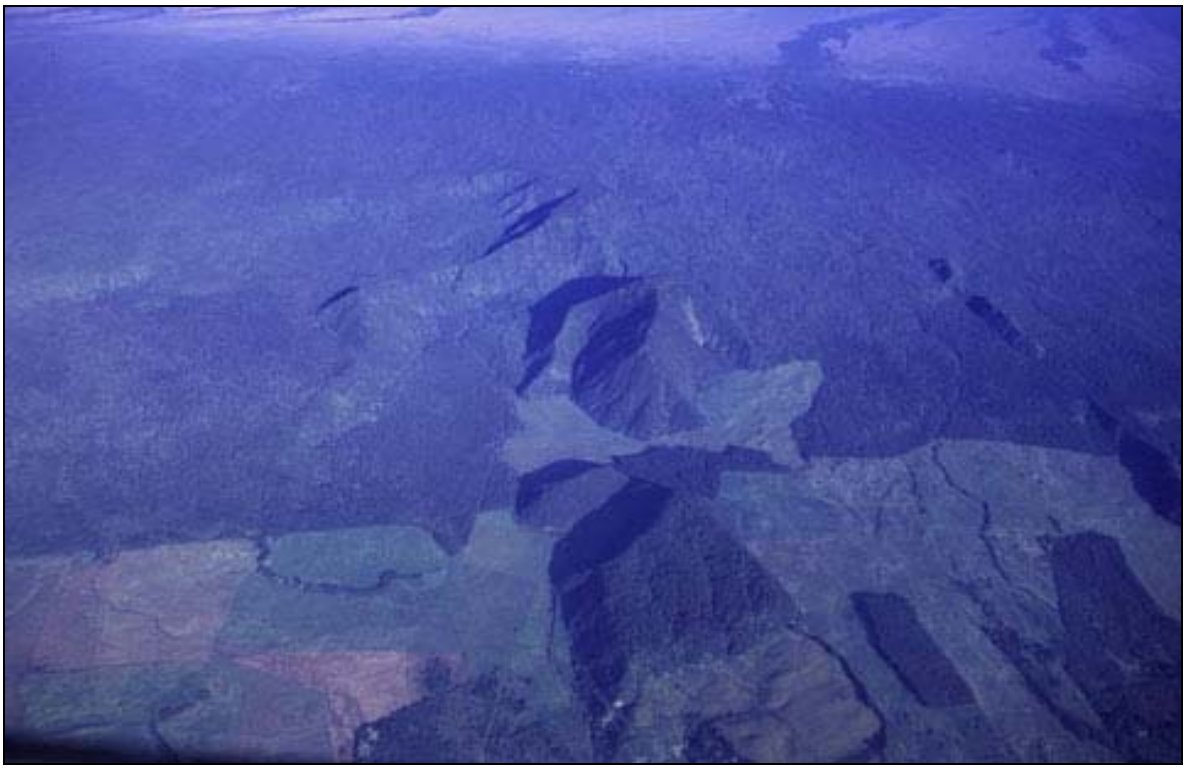
Kaʻū Preserve
Hawaiʻi Island, Hawaiʻi

Long-Range Management Plan
Fiscal Years 2007–2012



Submitted to the
Department of Land & Natural Resources
Natural Area Partnership Program

Submitted by
The Nature Conservancy – Hawaiʻi Operating Unit
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EXECUTIVE SUMMARY

The Nature Conservancy of Hawai‘i (TNCH) has a statewide system of 12 preserves totaling 32,000 acres and has helped protect another 160,000 acres through cooperative projects with federal, state, county, and private partners. On the island of Hawai‘i, the Conservancy manages two forest preserves: Kona Hema and Ka‘ū. Management at Ka‘ū Preserve is being considered for funding under the State's Natural Area Partnership (NAP) Program. This innovative program provides matching funds ($2 state to $1 private) for the management of qualified private lands that have been permanently dedicated to conservation.

While the Ka‘ū forest is largely intact, it is vulnerable to irreversible change in the absence of effective management. The Conservancy acquired four parcels in this forest to ensure protection of key habitat and to facilitate partnering with other managers of contiguous lands. The Conservancy also facilitated the purchase of the Kahuku Ranch by the National Park Service, the largest conservation land acquisition project in the history of the State. The time is ripe for a collaborative approach to forest conservation and compatible public use management in this region. Accelerated planning and management of Conservancy lands will provide a catalyst for conservation at a landscape scale.

The Ka‘ū Preserve Long-Range Management Plan documents the long-range goals and strategies for preserve management over the next 6 years (FY2007 – 2012) and was prepared in compliance with the rules governing the NAP program (Hawai‘i Administrative Rules Chapter 13-210).

Over the next 6 years we will work to collect and document the necessary information about the biological resources of the area and the primary threats to those resources in order to better understand them. Our management efforts in Ka‘ū Preserve will focus on the following activities:

1. **Ungulate control** – The Nature Conservancy 's primary management activity in Ka‘ū will be to maintain forest integrity, reduce erosion, and limit weed invasion by reducing ungulate levels through use of standard management tools. Pigs are the primary targets of our removal programs, while mouflon sheep and goats will also be targeted if they occur in the preserve. We will also conduct ungulate monitoring as part of our routine field operations.

2. **Invasive Plant Control** – The goal of this program is to control high priority invasive plants in the preserve, and prevent the introduction and spread of problem weeds to areas where they are not currently established. As part of our routine management program, the Conservancy will survey for and maintain maps of habitat-modifying weeds and initiate control at strategic locations.

3. **Resource Monitoring** – Monitoring is imperative to providing data that can be used to guide management programs at Ka‘ū Preserve. Our goal is to monitor changes in the integrity of the ecosystems in and around the preserve and to determine whether critical

threats to those ecosystems are increasing or decreasing. We will use these data to gauge the effectiveness of our conservation strategies.

4. **Rare Species Protection and Research** – To date, five rare plant species and two rare bird species have been observed in Kaʻū Preserve based on data provided by the Hawaiʻi Natural Heritage Program (HINHP) and observations by staff. Additional rare species reported from adjacent lands and similar habitats are likely to be found in Kaʻū Preserve with future surveys. Our goal is to prevent the extirpation of rare species in the preserve and to encourage research, predator control, and captive propagation of rare plant and bird species. Protecting habitat essential to the majority of the preserve's native plants and animals will be our primary protection strategy. We will also assess threats to the rarest species and take measures to protect them, as needed. Staff will also search for rare plant populations during routine management activities, and rare species maps will be updated on a periodic basis.

5. **Community Outreach** – The main objective of our outreach program is to increase awareness of Kaʻū Preserve, the Kaʻū watershed and native ecosystems, their importance, threats, and efforts to protect them. More specifically, we seek to encourage and facilitate active participation and community pride among the residents of the Kaʻū District in the effective conservation of this special resource. The key strategies for our public outreach include a variety of potential programs, including: environmental education, summer intern and youth employment, volunteer, guided trips, community meetings, and hiking and hunting programs.

6. **Watershed Partnership –** The Nature Conservancy is a member of, and our preserves are included within, the Three Mountain Alliance, an extension of the Olaʻa-Kīlauea Partnership. The members of this Alliance have initiated discussions about coordinating information gathering, management planning, community outreach, and on-the-ground conservation action. Our goal is to facilitate further development of the Three Mountain Alliance and help to implement initiatives that address top watershed, forest, and biodiversity threats.

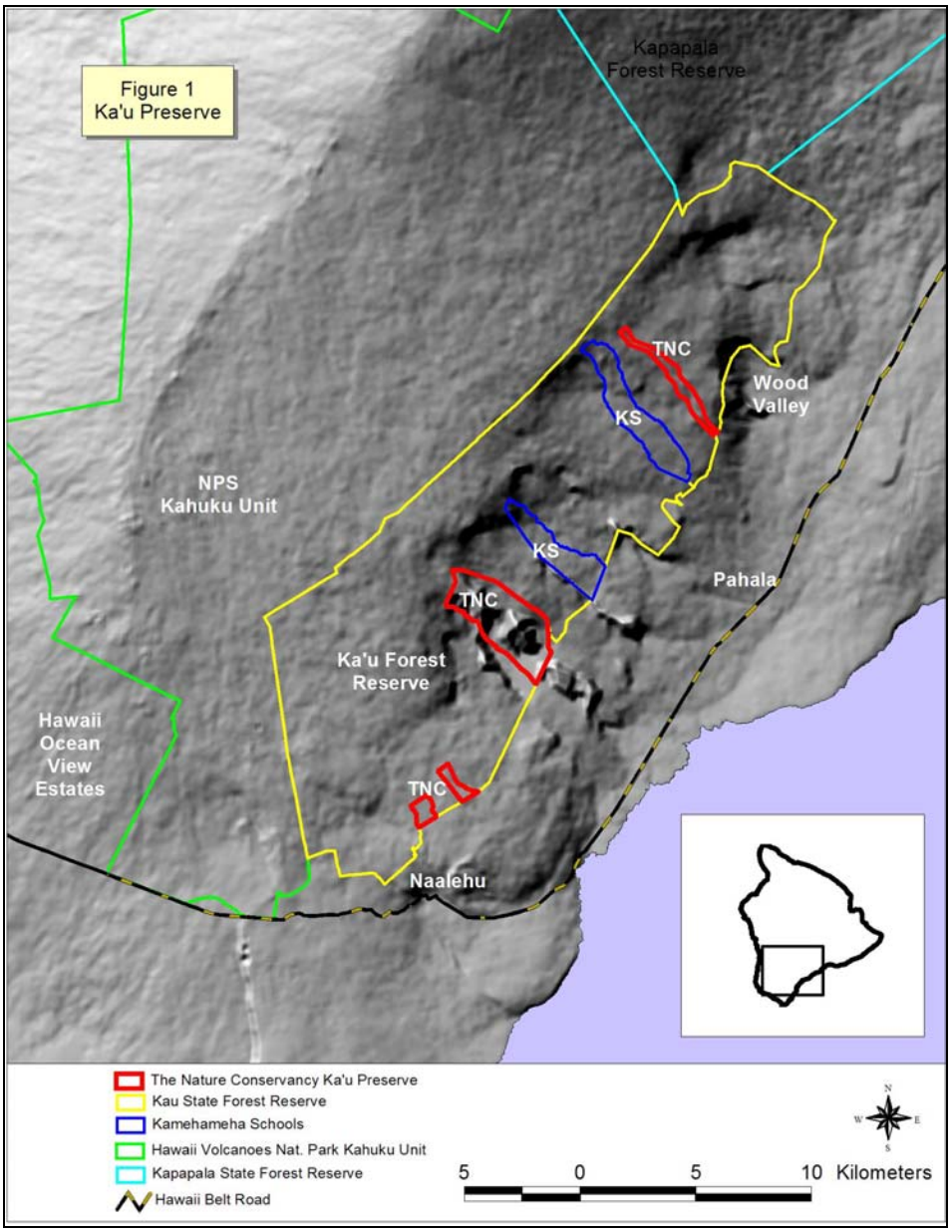
The State Department of Land and Natural Resources (DLNR), which administers the NAP program, will be kept apprised of our progress in the preserve through written reports and an annual inspection. Operational Plans and Progress Reports will be submitted annually (the Conservancy has adopted a July 1 – June 30 fiscal year). These documents will be available upon request to others who are interested.

The first section of this plan contains a brief overview of the native resources that are protected at the Kaʻū Preserve. In the second section are management considerations that have shaped our programs. Finally, each management program is discussed in turn. Program goals are followed by an explanation of the management method we have chosen, and yearly objectives for each program from FY2007 through 2012 are also listed.

RESOURCES SUMMARY

General Setting

The Kaʻū Preserve (Figure 1) was established by The Nature Conservancy in 2002 to protect biologically rich and intact forest. It was purchased by the Conservancy from a subsidiary of C. Brewer & Co. Ltd. who had owned the lands for over 100 years. It is contiguous to and within the external boundaries of the State's Kaʻū Forest Reserve on the southwest flank of Mauna Loa volcano, up slope from the coastal agricultural area between Waiʻōhinu and Pāhala in the Kaʻū District of the Big Island. The 3,548-acre Preserve, which includes four separate units, is positioned within one of the largest areas of intact forest land in the State, totaling 68,500 acres.



Native Natural Communities

There are four native-dominated natural communities in the Kaʻū Forest Reserve, and all four are also represented in Kaʻū Preserve:

(1) Koa/ʻŌhiʻa Montane Mesic Forest is present at the highest elevation portion of the Keaīwa unit;
(2) Koa/ʻŌhiʻa Montane Wet Forest covers the middle portion of the Keaīwa unit;
(3) ʻŌhiʻa Montane Wet Forest covers the lower portion of the Keaīwa unit and the upper portion of the Kaiholena unit; and
(4) ʻŌhiʻa Lowland Wet Forest covers the lower portion of the Kaiholena unit and all of the Kāhilipali and Kīʻolokū units (Figure 2, Table 1).

The very high quality of the wet and mesic forest communities in Kaʻū provides a rare opportunity to implement management before it is too late or costly.

On Hawaiʻi, **Koa/ʻŌhiʻa Montane Mesic Forest** is the habitat of the endangered Hawaiian broadbean (*Vicia menziesii*) and a number of rare plant taxa, including members of the genera *Clermontia*, *Phyllostegia*, *Stenogyne*, and *Melicope*. This rare forest type is often important habitat for endangered forest birds. Protected examples of this community are in the Hakalau National Wildlife Refuge and Manukā Natural Area Reserve on Hawaiʻi, and the Kuia Natural Area Reserve on Kauaʻi.

Koa/ʻŌhiʻa Montane Wet Forest occurs on the islands of Kauaʻi, Maui, and Hawaiʻi and is not considered rare. This moderately imperiled forest type has a good representation of ʻōhiʻa and are often rich in native forest birds and invertebrates.

ʻŌhiʻa Montane Wet Forest is one of the most widespread wet forest communities in the Hawaiian Islands. This community type is moderately imperiled, and some occurrences are known to include rare plants, birds, and invertebrates. It is often important habitat for endangered forest birds. The steep slopes of the Kaiholena unit contain a subtype of this community called Wet Cliff, dominated by a mix of ferns and shrubby ʻōhiʻa.

In Kaʻū, the **ʻŌhiʻa Lowland Wet Forest** is floristically similar to the ʻŌhiʻa Montane Wet Forest immediately above it in elevation. This community type is moderately imperiled and provides habitat for rare native plants. It is typically not important habitat for endangered forest birds on Hawaiʻi Island due to the presence of mosquitoes associated with its lower elevation. The lower portions of the Kāhilipali and Kīʻolokū units contain a subtype of this community, ʻŌhiʻa /Uluhe (*Metrosideros/Dicranopteris*) Fern Forest, which is composed of a nearly continuous blanket of uluhe (*Dicranopteris linearis*) with emergent and widely spaced ʻōhiʻa trees.

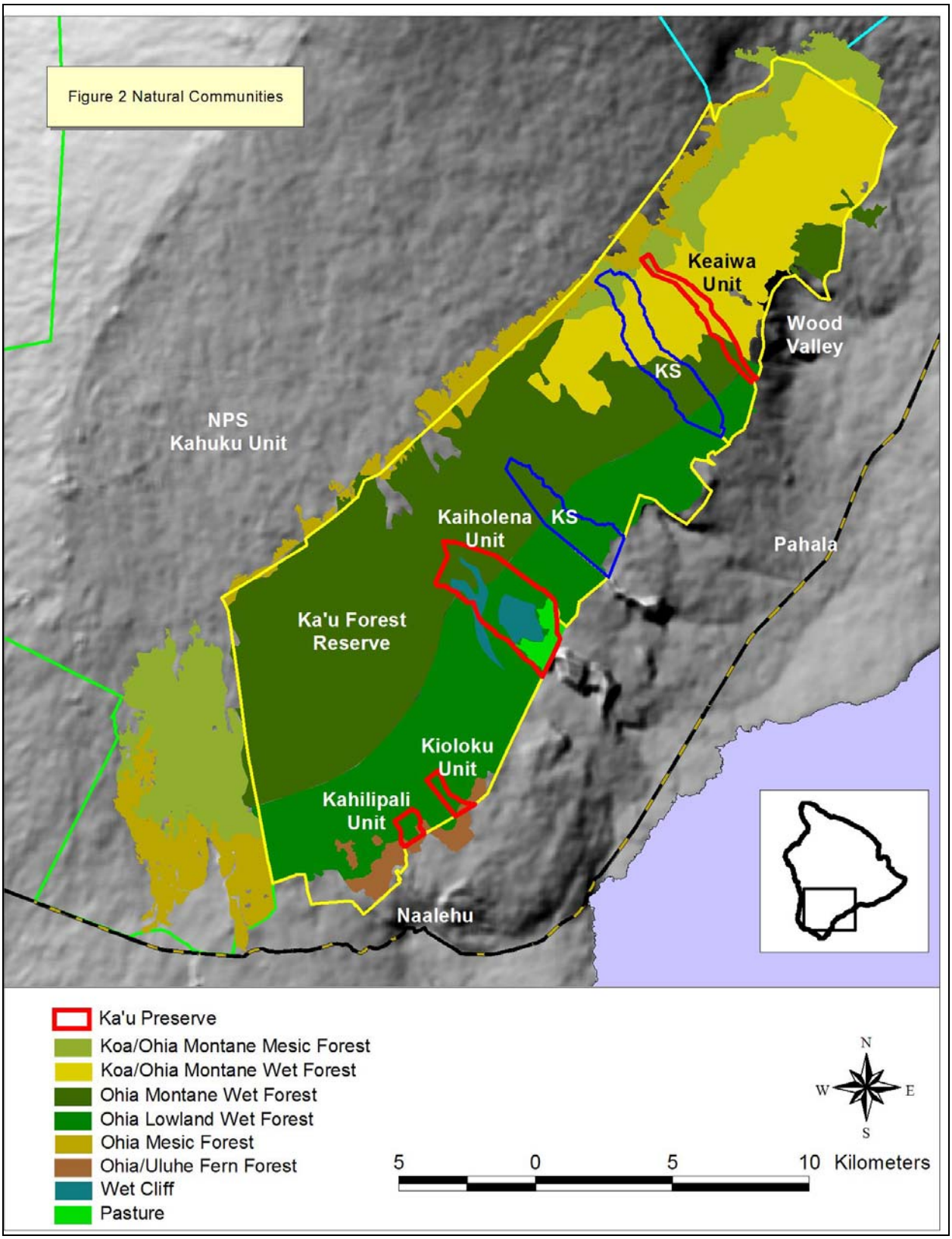


Figure 2 Natural Communities
Keaiwa Unit
Wood Valley
KS
NPS Kahuku Unit
Kaiholena Unit
KS
Pahala
Ka'u Forest Reserve
Kioloku Unit
Kahilipali Unit
Naalehu
Ka'u Preserve
Koa/Ohia Montane Mesic Forest
Koa/Ohia Montane Wet Forest
Ohia Montane Wet Forest
Ohia Lowland Wet Forest
Ohia Mesic Forest
Ohia/Uluhe Fern Forest
Wet Cliff
Pasture
N
W
E
S
5 0 5 10 Kilometers

Table 1. Natural Communities of Ka‘ū Preserve

Natural Community (common and scientific names)	Heritage Global Rank*
Koa/‘Ōhi‘a Montane Mesic Forest *Acacia koa/Metrosideros polymorpha* Montane Mesic Forest	G1
Koa/‘Ōhi‘a Montane Wet Forest *Acacia koa/Metrosideros polymorpha* Montane Wet Forest	G3
‘Ōhi‘a Montane Wet Forest *Metrosideros polymorpha* Montane Wet Forest	G3
‘Ōhi‘a Lowland Wet Forest *Metrosideros polymorpha* Lowland Wet Forest	G3

* Key to Heritage Global Ranks:
G1 = Critically imperiled globally (typically 1-5 current occurrences).
G3 = Moderately imperiled globally or restricted in range (typically 21-100 current occurrences).

Native Flora

From a statewide perspective, the southeast portion of Mauna Loa (eastern side of the Southwest Rift Zone), is surpassed only by East Maui in the number of different types of ecosystems present. Considering all of its nine ecosystems, this region is home to more extant, endemic species of flowering plants (178 species) than any other region of Hawai‘i Island. In fact, its mesic and wet forest ecosystems alone support 153 endemic plant species. While Ka‘ū Preserve does not contain the full diversity of species found within the region, the majority of the lands are very high quality. A list of native plants that occur in the Kaiholena unit is now being developed (see Appendix 1 for a draft listing of native plants).

The mesic and wet forests of the Ka‘ū region are home to at least 12 known species of rare plants (Table 2 and Appendix 2). Six of these are endangered, two are candidates for listing as endangered, three are species of concern, and one has a restricted range.

Data for rare plants and animals in Ka‘ū come from widely-spaced survey transects, very few of which actually fall within the preserve. Much of the rest of the land, within and outside the preserve has not been surveyed but almost certainly harbors more rare elements.

Five rare plant species have been observed in Ka‘ū Preserve. Three species, *Cyanea tritomantha* (candidate), *Nothocestrum breviflorum* (listed endangered), and *Phyllostegia vestita* (species of concern) are recorded in the Natural Diversity Database. They were all reported within the Kaiholena unit: *C. tritomantha*, last observed in Kaiholena in 1912 and *P. vestita*, last observed in Kaiholena in 1961, have never been reported within the nearby Ka‘ū Forest Reserve. Two additional species have been observed in the Kaiholena unit by TNC staff: *Trematolobelia grandifolia* (species of concern) and *Lobelia hypoleuca* (restricted range). They do not appear on the map in Appendix 2 because they were found recently, after the map was made.

Many of the plants that occur on Conservancy lands in Kaʻū are not listed in the State or Federal Register in any of the categories that may make them rare however, plants like *Strongylodon ruber*, *Charpentiera obovata*, and *Touchardia latifolia,* are rare on Hawaiʻi Island and/or rare from a population standpoint and will be treated as such with regards to rare species management for this plan. Subpopulations of *Pritchardia lanigera* near Kaiholena were last observed in 1980 and were thought to be extirpated. However two small subpopulations were recently located by TNC staff working with local hunters. These subpopulations should be considered endangered.

Table 2. Rare Plants of Kaʻū Preserve (or vicinity)

Species	**Federal Status***	**Heritage Global Rank****
Asplenium fragile var *insulare*	LE	G5T1
Clermontia lindseyana	LE	G1
Cyanea stictophylla	LE	G1
Cyanea tritomantha	C	G1
Lobelia hypoleuca	-	G3
Melicope zahlbruckneri	LE	G1
Nothocestrum breviflorum	LE	G1
Phyllostegia floribunda	C	G1
Phyllostegia velutina	LE	G1
Phyllostegia vestita	SOC	G2
Pritchardia lanigera	SOC	G1
Trematolobelia grandifolia	SOC	G2

* Key to Federal Status:
Listed Endangered (LE) = Taxa listed as endangered.
Candidate (C) = Taxa for which substantial information on biological vulnerability and threat(s) support proposals to list them as threatened or endangered.
Species of Concern (SOC) = Taxa for which available information meets the criteria for concern and the possibility to recommend as candidate.

** Key to Heritage Global Ranks:
G1 = Critically imperiled globally (typically 1-5 current occurrences).
G2 = Imperiled globally (typically 6-20 current occurrences).
G3 = Moderately imperiled globally or restricted in range (21-100 current occurrences).
G5 = Demonstrably widespread, abundant, and secure.
T1 = Subspecific taxa critically imperiled globally. 1-5 occurrences and/or fewer than 1,000 individuals remaining; or more abundant but facing extremely serious threats range-wide.

Native Terrestrial Fauna

One of the richest assemblages of endangered forest birds (*e.g.,* Hawaiʻi Creeper, Hawaiʻi ʻĀkepa, ʻAkiapōlāʻau, ʻIo) inhabit the largely intact forests of Kaʻū. Five endangered forest birds have been reported in the wet and mesic forests of Kaʻū (Table 3 and Appendix 3). Of these, three have been reported within Kaʻū Preserve: the ʻIo or Hawaiian Hawk, the Hawaiʻi

ʻĀkepa, and the Hawaiian Crow or ʻAlalā, historically found in Kaʻū but now probably extirpated.

Two other rare bird species are likely to occur in the preserve, but more information is needed: ʻAkiapōlāʻau and the Hawaiʻi Creeper.

Endangered Hawaiian hoary bats, ʻōpeʻapeʻa, are also known to inhabit the wet montane forests of Kaʻū and likely roost, forage, and breed in the preserve, but more information is needed (Theresa Menard, pers. comm.).

Few native invertebrates have been given endangered status, and are generally very poorly understood, but the intact natural communities of Kaʻū no doubt include hundreds of native invertebrates, the majority of which are endemic to the archipelago, and several of which are likely endemic to the Kaʻū region.

Table 3. Rare Vertebrates of Kaʻū Preserve (or vicinity)

Species	**Federal Status***	**Heritage Global Rank****
Buteo solitarius (Hawaiian Hawk, ʻIo)	LE	G2
Corvus hawaiiensis (Hawaiian Crow, ʻAlalā)	LE	G1
Hemignathus munroi (ʻAkiapōlāʻau)	LE	G1
Lasiuris cinereus semotus (Hawaiian hoary bat, ʻōpeʻapeʻa)	LE	G5T2
Loxops coccineus coccineus (Hawaiʻi ʻĀkepa)	LE	G2
Oreomystis mana (Hawaiʻi Creeper)	LE	G2

* Key to Federal Status:
Listed Endangered (LE) = Taxa listed as endangered.

** Key to Heritage Global Ranks:
G1 = Critically imperiled globally (typically 1-5 current occurrences).
G2 = Species imperiled globally (typically 6-10 current occurrences).
G5 = Demonstrably widespread, abundant, and secure.
T2 = Subspecific taxa imperiled globally. 6-20 occurrences and/or 1,000-3,000 individuals remaining; or more abundant but facing serious threats range-wide.

MANAGEMENT

Management Considerations

1. Our primary management focus is to prevent degradation of the native forest by reducing feral ungulate damage, limiting the spread of non-native, habitat-modifying plants, and preventing the introduction of other invasive species. We are also committed to improving community outreach and to continue providing access as required by law for people who want to use the preserve in ways that will not degrade its natural resources.

2. The preserve is divided into four separate units spanning a distance of 12 miles. Each unit shares three boundaries with the State's Kaʻū Forest Reserve, and one boundary with a private landowner who recently purchased the properties from Kaʻū Agribusiness, a subsidiary of C. Brewer. As a result of sharing the southern (lowland) boundary with private agricultural lands, public access via unimproved roads is somewhat limited, and we carefully coordinate our management and interpretive activities with work in these adjacent agricultural areas.

3. Although the threat of fire is somewhat diminished due to the high level of precipitation on the Preserve (approximately 60-120 inches annually), the proximity of the units to paved roads increases the possibility that a fire could start either accidentally or intentionally and affect the Preserve, particularly after a period of drought. Our participation with the Three Mountain Alliance will include working on a Fire Initiative with the other Alliance members.

4. The recent acquisition of Kahuku Ranch by the National Park Service (NPS) creates a mosaic of Kaʻū lands, with four principal landowners, all sharing a mandate for conservation and management of Hawaiʻi's natural resources: The Nature Conservancy, NPS, the State Department of Land and Natural Resources, and Kamehameha Schools. This provides the foundation for collaborative management at the watershed level as an effective way to address shared management challenges and opportunities.

5. There is potential to provide additional public access to the Forest Reserve and the preserve at several points along their lower boundaries, as most access roads are not open to the public at this time. Roads that are currently used by the public to access Kaʻū watershed lands include: Hāʻao Springs Road, Mountain House Road and Lorenzo Road. Access into upper areas of the Forest Reserve is anticipated to improve with the acquisition of Kahuku Ranch by NPS. Access into the upper areas of the preserve is limited by difficult terrain and a lack of roads and trails, so helicopter access is necessary.

6. There is a high level of interest regarding forest management in Kaʻū from various groups of people living near the preserve. This provides a rationale for coordinated community outreach and functional partnerships that promote compatible uses of the forest (*e.g.,* environmental education, recreation, native gathering, hunting, rare species conservation, etc.).

7. As provided by law, appropriate access to the preserve for traditional practice will help to mitigate the perception of decreased access. Three gates will be available for preserve access on the Kaiholena side and fence stepovers will be installed if needed, with locations to be determined in consultation with the community.

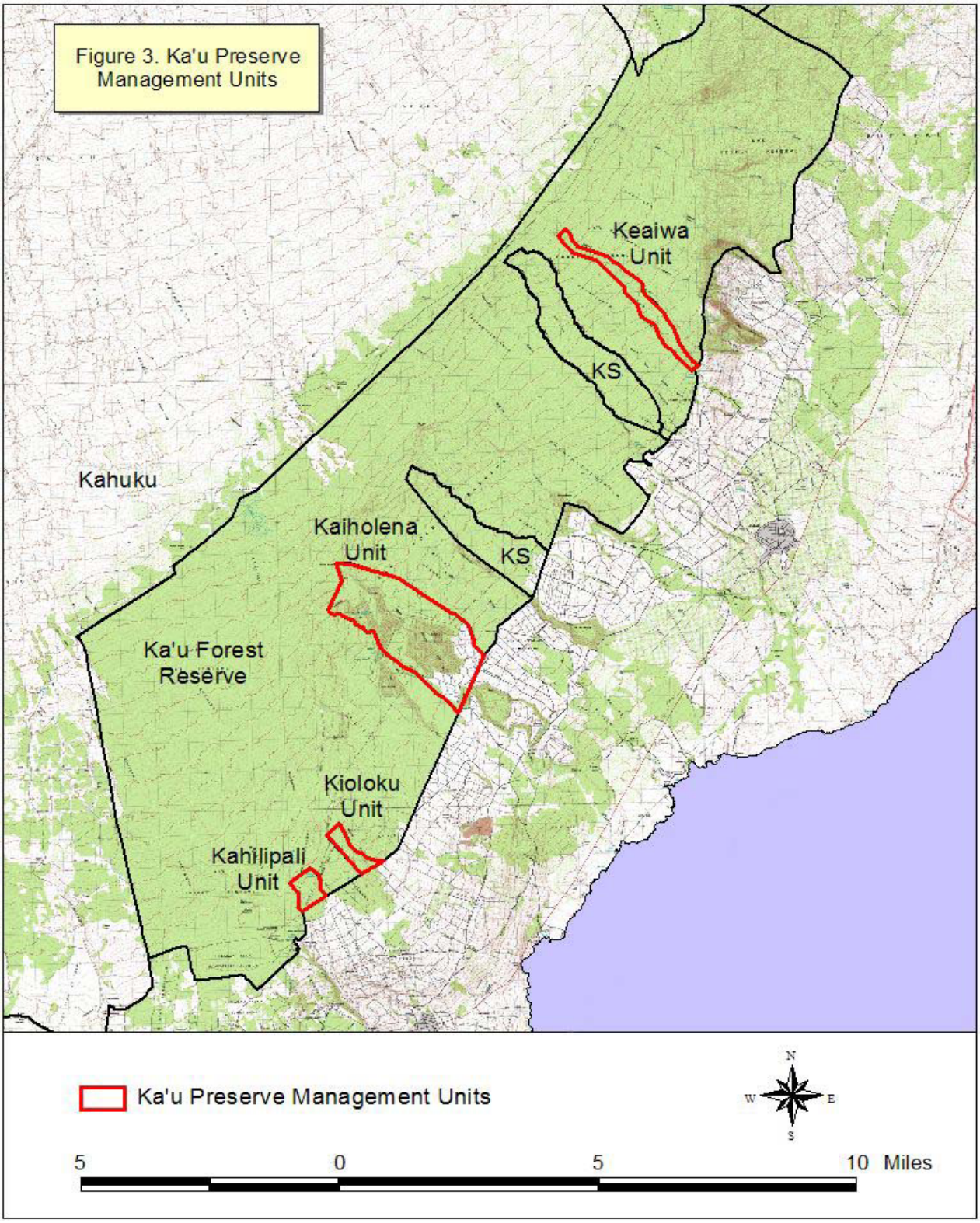


Figure 3. Ka'u Preserve Management Units
Keaiwa Unit
KS
Kahuku
Kaiholena Unit
KS
Ka'u Forest Reserve
Kioloku Unit
Kahilipali Unit
Ka'u Preserve Management Units
N
W
E
S
5
0
5
10 Miles

Management Areas/Units

Kaʻū Preserve is divided into four separate units: Kāhilipali , Kīʻolokū, Kaiholena, and Keaīwa (Figure 3).

1. The Kāhilipali unit is the smallest (169 acres) and westernmost unit, accessed via the 4wd Mountain House Road. The elevation ranges from approximately 2,400 to 2,640 ft. The annual precipitation is 2,000 mm (79 in). A portion of this unit is zoned Agriculture and the rest is zoned for Conservation (subzone: Resource). Most of the unit contains ʻŌhiʻa Lowland Wet Forest, however the forest in the lower portion of the unit grades into the community subtype ʻŌhiʻa /Uluhe Fern Forest. Portuguese Springs is located in the upper northeast corner, at the head of Alapaʻi Gulch, which runs along the northeast boundary of the unit. A maintained pipeline diagonally traverses the middle of the unit providing a corridor for non-native invasive plants such as guinea grass (*Panicum maximum*), sourbush (*Pluchea carolinensis)* and bamboo orchid (*Arundina graminifolia*), and more serious weeds such as strawberry guava (*Psidium cattleianum*), Koster's curse (*Clidemia hirta*), and Christmas berry (*Schinus terebinthifolius)*. Glorybush (*Tibouchina urvilleana*) occurs along the Mountain House Road.

2. The Kīʻolokū unit is the next largest (211 acres) and is located approximately 1 mile north of the Kāhilipali unit. The elevation ranges from approximately 2,400 to 2,700 ft. The annual precipitation is 2,000 mm (79 in). The lower portion is accessed via ranch roads, while the upper elevation is accessed via the 4wd Mountain House Road. Waiaele Gulch runs along a portion of the northeast boundary of the unit. The forest, like the Kāhilipali unit, is mainly ʻŌhiʻa Lowland Wet Forest, with some areas of ʻŌhiʻa /Uluhe Fern Forest. Glorybush (*Tibouchina urvilleana*) occurs along the Mountain House Road, and weeds such as strawberry guava (*Psidium cattleianum*) and Koster's curse (*Clidemia hirta*) are present in the forest. This unit is zoned for Agriculture.

3. The Kaiholena unit is the largest (approximately 2,600 acres) and is centrally located 4 miles from the Kīʻolokū unit and 6 miles from the Keaīwa unit. A puʻu (hill or mount), Kaiholena, rises sharply from its base elevation of 2,000 ft to a height of 3,723 ft and is geologically much older than the surrounding, more gently rolling Mauna Loa flows. Just northwest of the Puʻu Kaiholena, Puʻu Makaalia rises to a height of 4,240 ft. Hīlea Gulch runs between these two puʻu. Old Plantation Springs, a portion of whose water rights are held by the previous owner, is nestled in the southern folds of Puʻu Makaalia at approximately 3,500 ft. The annual precipitation is 2,000 mm (79 in) except for a wetter are on the south side of Puʻu Kaiholena which has 3,000 mm (118 in) annual precipitation. A portion of this unit is zoned Agriculture and the rest is zoned for Conservation (subzones: Protective and Resource).

   Directly south of Puʻu Makaalia lies Puʻu One (3,220 ft elevation), on State land just outside of the Kaiholena unit boundary. Historically this puʻu was considered with the others as all one place. The western side of Puʻu One is accessed via a 4wd road that leads to a gauging station on one branch of Hīlea Gulch.

The forest in the lower portion of the Kaiholena unit is ʻŌhiʻa Lowland Wet Forest, becoming ʻŌhiʻa Montane Wet Forest at approximately 3,200 ft elevation. Five rare plants have been reported in this unit. Very few weeds have established in Kaiholena. Those present and still controllable include Japanese anemone (*Anemone hupehensis*), palm grass (*Setaria palmifolia*), and strawberry guava (*Psidium cattleianum*). *Tibouchina herbacea* is present along the Puʻu One access road. There are 315 acres of former cane land at the base of the Puʻu Kaiholena which have been converted to pasture and are now leased by a local rancher for cattle grazing. An incipient population of silk oak (*Grevillea robusta*) occurs within the pasture.

4. The Keaīwa unit is the second largest (511 acres) and easternmost unit. Keaīwa Reservoir (on State land) lies at the base of the unit at approximately 3,000 ft elevation. From there the unit stretches mauka. A 6 km-long strip of land, at its widest point, the Keaīwa unit is only 570 m wide. Its northern boundary (5,700 ft) is approximately 1 km from the Kahuku unit of Hawaiʻi Volcanoes National Park. The annual precipitation in the lower portion of the unit is 3,000 mm (118 in), in the middle portion is 2,000 mm (79 in) and in the upper portion is 1,500 mm (59 in). Piʻikea and Kāʻalaʻala Gulches meander in and out of the Keaīwa unit. The uppermost portion of the unit (above 5,300 ft) contains Koa/ʻŌhiʻa Montane Mesic Forest (50 acres), while much of the rest of the unit consists of Koa/ʻŌhiʻa Montane Wet Forest, except for lower third of the site (below 4,000 ft) which is ʻŌhiʻa Montane Wet Forest and the bottom 50 acres (below 3,400 ft) which are ʻŌhiʻa Lowland Wet Forest. The endangered forest bird, Hawaiʻi ʻĀkepa, has been reported in this unit, observed between 4,000 and 5,000 ft elevation in 1995. Several highly invasive plants occur near the Keaīwa Reservoir, including night-blooming jasmine (*Cestrum nocturnum*), Japanese anemone (*Anemone hupehensis*), and strawberry guava (*Psidium cattleianum*). The nearby village of Wood Valley (2 km away) is heavily infested with plume poppy (*Bocconia frutescens*), and the community there is also in the process of eradicating an incipient population of coqui frogs. This unit is zoned for Conservation (subzone: Protective).

Management Programs

Program 1: Ungulate Control

Program Goal: To eliminate ungulates (cattle, pigs, sheep, and goats) from the Kaiholena Unit by 2012 and to reduce ungulate damage in the Kāhilipali, Kīʻolokū, and Keaīwa Units.

This program represents an estimated 44% of the overall effort and budget in this long range management plan.

Preliminary measurements on survey transects show extremely high levels of ground disturbance by pigs: 100% of 30 stations in the Kaiholena Unit showed pig activity. Additional surveys conducted in the Keaiwa Unit and parts of the Kaʻū Forest Reserve show extensive, severe ground disturbance by pig activity. Diminished diversity of groundcover and understory species has been observed over large areas. In some severely impacted parts of the forest common groundcover and understory plants are persisting only epiphytically upon trees and tree ferns. Weed surveys conducted in the Kaiholena Unit show a direct correlation between presence of weed species and pig activity. High levels of ground disturbance, coupled with reduced groundcover, has led to an increase in water runoff, sheet erosion and stream bank collapse. There is also a very high likelihood of wild cattle, Mouflon sheep and feral goats in the vicinity.

Of the four Kaʻū Preserve units, the largest expanse of intact, high-quality native lowland wet forest and most significant biological resources (rare plants and high native diversity) occur in the roughly 2600-acre Kaiholena Unit. Therefore the best and most cost-effective alternative is to enclose the Kaiholena Unit by incrementally building fences and to utilize trapping and hunting to bring the number of feral ungulates in the enclosures to zero as quickly as possible.

Construction of the first proposed fence in the Kaiholena Unit is being planned for Year 1. The proposed alignment will enclose 980 acres including Puʻu Kaiholena, allowing the now uncommon native plants that persist only in the steep gullies and folds of the puʻu to expand their coverage. It will also protect the culturally significant Iholena Banana patch, and, once ungulates are removed, this exclosure will serve as a reintroduction site for several rare plants. Surveys will be conducted in Year 3 to find the optimum alignments for additional fences in the Kaiholena Unit, our main objective being to remove ungulates from Puʻu Makaalia.

The majority of the proposed alignment follows existing 4-wheel drive roads and pasture edges. It is much more feasible to align the fence along existing roads as much as possible than to follow the unit's boundary which is located in more difficult terrain. The proposed alignment ties in to the extremely steep terrain of Hīlea Gulch. Through ground reconnaissance we have determined that the natural barrier of this gulch will work to keep ungulates out. The sides of this gulch are predominantly vertical and are impassible by ungulates. The few places which can be traversed will be fenced off with sections of ungulate-proof fencing. Utilizing the gulch as a barrier rather than totally encircling the puʻu with a continuous fence expands the total exclosure area by 200 acres and will effectively restore a highly eroded plain that ultimately feeds into

Hīlea Stream. Protecting the stream banks and restoring the plain will stop sediment from running off into the stream and depositing in the ocean.

Pig traps made from hog panels will be placed on the perimeter of the unit. The traps will be baited with macadamia nuts and checked frequently. This technique has proved extremely successful in our Kona Hema Preserve where over 400 pigs have been removed from the 1,800 acre Kapu‘a unit over the last 3 years. Supplemental hunting will take place by staff and/or volunteers. Permanent ungulate activity monitoring transects have been installed in the Kaiholena unit and will be monitored when the fence is constructed and every 6 months after that for detection of changes in ungulate activity level.

The estimated cost of this fence is approximately $200,000 and will be subcontracted out. Funding for fence construction is in the process of being secured through the USDA Natural Resources Conservation Service’s Wildlife Habitat Incentives Program (NRCS WHIP), which will provide up to 75% of the cost. The rest of the cost will be covered by TNC and a portion will be matched with this NAPP request. Final approval for this funding is expected in April 2006.

Relying on public hunting, aerial shooting, staff hunts, and other means to reduce feral animal populations instead of fenced enclosures is not a feasible alternative because as long as the Kaiholena Unit remains unfenced, feral animals will continue to enter the area from adjacent lands. Animal removal would have to continue indefinitely. This long-term control program would be expensive and unpopular, and make the goal of natural resource protection and rare plant reintroduction impossible. The best long-term solution is therefore to enclose the Kaiholena Unit, and remove all feral ungulates as quickly as possible.

However, constructing fences that enclose all four Ka‘ū Preserve units is not cost-effective or feasible at the present time. The Kāhilipali and Kī‘olokū units are isolated, small (169 and 211 acres, respectively), and somewhat degraded by invasive plants. Therefore fencing these units would not result in a significant enough contribution to resource protection from ungulates to justify the expenditure of funds that fencing would require. The Keaīwa unit (511 acres) is a “spaghetti” parcel with elongated dimensions: 6 km long by 500 m wide. Although significant biological resources are present, particularly in the upper elevation, we are not proposing to construct fences in this unit at the present time. However, the acceptance of this 6-year plan does not preclude the re-consideration of this possibility in the future.

In these unfenced units, as well as the unfenced portions of the Kaiholena unit our objective is to reduce ungulate damage by enhancing hunter access (by installing signs, check-in stations, etc.) and encouraging public hunting in these areas through outreach. A back-country camp consisting of two canvas tent cabins is being proposed in the upper reaches of the Kaiholena unit. This will enable staff to have a dry place to camp overnight while conducting surveys, monitoring, and constructing fence. These tents will also be available for hunters to use. Permanent ungulate activity monitoring transects have been installed in these units and will be monitored periodically for detection of changes in ungulate activity level.

Additionally, in cooperation with the NPS, the State and Kamehameha Schools, a site survey for optimum large-scale ungulate fencing will be conducted (see Watershed Partnership Program). Strategies to remove ungulates from remote areas and to enhance ungulate hunter access will be identified and implemented.

Ungulate Control Program Activities

Year 1 (FY2007)
- Construct fence (Figure 4)
- Make existing cattle fence ungulate-proof
- Construct back-country camp (tent cabins, water catchment) and LZ's
- Begin ungulate removal
- Identify/implement strategies to enhance ungulate hunter access

Year 2 (FY2008)
- Continue ungulate removal
- Maintain fences and signs
- Assist NPS/State in site survey for optimum ungulate fencing

Years 3-6 (FY2009 – FY2012)
- Continue ungulate removal
- Maintain fences and signs
- Survey for optimum placement of additional fences in Kaiholena unit

Fence specifications: The ungulate control fence will be 30,900 linear feet in length (elevation 2,000 to 3,400 ft) and will enclose 980 acres, utilizing the extremely steep terrain of Hilea Gulch (which is impassible by ungulates) as tie-off points (Figure 4). The fence alignment may change slightly, depending on the terrain. Where the fence crosses the road a gate will be installed for vehicle access. Three additional gates will be available for preserve access on the Kaiholena side and fence stepovers will be installed if needed, with locations to be determined in consultation with the community. Roughly 30% of the proposed fence alignment follows the edge of a pasture (10,250 ft), another 50% follows an existing 4WD road (15,105 ft) so minimal disturbance to vegetation will be required to install and maintain these sections. For the more remote sections, a corridor 4 ft. wide will be brushed to install the fence for a distance of 5,545 ft.

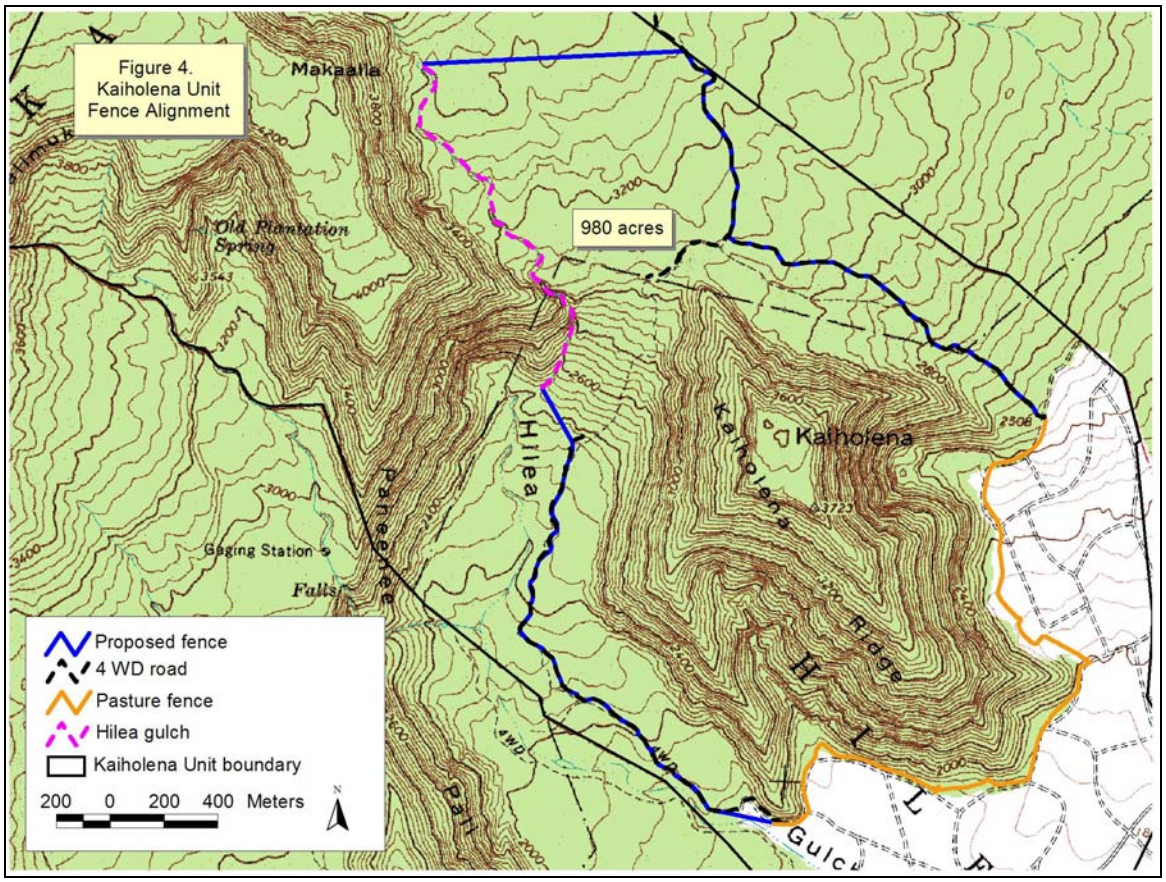
The ungulate fence will be constructed using 4 ft high tensile Bezinol-treated hogwire (1047-6-12-1/2) with one strand of high tensile barbed wire at the top. 6.5 ft tall galvanize-dipped T-posts will be installed 10-12 ft apart and driven to a uniform depth (5 ft remaining above ground) that will allow one strand barbed wire above the hogwire. Hogwire will be installed as close to the ground surface as possible (less than 2 inches) and deadmen will be used when necessary to anchor the wire to the ground. This fence is not designed to be 100% effective at prohibiting Mouflon sheep, however we have never observed sheep in this very wet forest. It is possible that sheep could eventually move into the area, particularly as pressure from hunting in the NPS Kahuku Unit above increases. Our fence design for the Makaalia subunit will take this into consideration when we propose the upper elevation alignment at a later date.

Sign specifications: Approximately 20 signs will be installed throughout the preserve along commonly used trails. These signs will detail preserves rules, give safety precautions, promote wildfire awareness, and identify restoration sites and management activities. They will mention that funding for this project comes through the State's Natural Area Partnership Program. Sign materials may vary from metal, wood, or plastic. Pursuant to Hawai'i Administrative Rule 13-5-22, no sign shall exceed 12 square feet in area and shall be non-illuminated. All signs will be self-supporting and less than or equal to 8 feet above finished grade.

Back-country camp specifications: Two 10 x 12' canvas tent cabins will be erected upon wood-framed platforms in a remote area of the Kaiholena Unit (in the vicinity of Nanuamaia) to facilitate fence construction and hunting. A small (less than 150 sq. ft.) corrugated fiberglass or tin water catchment roof will be constructed in the vicinity of the cabins and a 50-250 gallon UV resistant plastic tank will be set below the catchment surface. All materials for the catchment system as well as the fences will be flown in by helicopter due to the elevation (4,000 ft) and steep terrain.

Landing zone specifications: Five to ten landing zones will be established in the upper reaches of the forest to assist conservation actions and for fire control and rescue. No single landing zone will exceed 100 sq ft. Landing zones will primarily be located in open and/or grassy locations. If vegetation clearing is required, it will be done with small motorized or hand tools and will not involve bulldozing, grading/grubbing, or ground disturbance. In some instances, it may be necessary to lay wood boards on the LZ for the helicopter skids. All landing zones on State land will be selected after consultation with DOFAW.

Additionally, in cooperation with the NPS, the State, and Kamehameha Schools, a site survey for optimum large-scale ungulate fencing will be conducted. Strategies to remove ungulates from remote areas and to enhance ungulate hunter access will be identified and implemented.



Program 2: Invasive Plant Control

Program Goal: To control high priority invasive plants in the preserve, and prevent the introduction and spread of problem weeds to core areas of native habitat where they are not currently established.

<u>This program represents an estimated 30% of the overall effort and budget in this long range management plan.</u>

Habitat-modifying weeds are non-native plants that have demonstrated the ability to suppress regeneration of and/or displace native vegetation. Many weeds become established when an area is disturbed by ungulates, which may also carry and spread seeds. Elimination of ungulates, therefore, may be one of the most effective means of controlling the introduction and spread of many habitat-modifying weeds in the preserve. To complement these efforts, our invasive plant control program focuses on removing habitat-modifying weeds that are already established in the preserve.

The presence of several serious invasive plant species both on and in the vicinity of the preserve has been identified (Table 4). We are currently half way through the process of conducting a systematic, preserve-wide inventory, survey and mapping effort to identify the location and extent of weed infestations. Priority weed maps and a species- and unit-specific management

plan are expected to be in place by August 2006. Management efforts will be prioritized according to controllability, proximity to sensitive core areas of the preserve, and along corridors leading into the preserve.

Initial results of the weed survey show a large infestation of strawberry guava and *Clidemia* in the Lower Hīlea subunit of the Kaiholena unit. This infestation requires immediate attention. Work in Year 1 will involve determining the perimeter of the infestation and beginning control work (using herbicide) on the outer edge of the infestation and working towards the core. A large infestation of *Tibouchina urvilleana* is located in the Kīʻolokū unit. An initial aerial survey has been conducted and will be followed up with ground surveys. Testing different methods of control in attempting to control the perimeter will be addressed in Year 1. Greater detail of these actions will be forthcoming in the weed management plan.

Where possible, we will use an Integrated Pest Management (IPM) approach to weed control. This will include manual methods, mechanical methods (including small motorized tools like chainsaws and weed-eaters) and/or herbicide use, and perhaps assisting with biological control initiatives. Cultural control aspects (minimizing soil disturbance and new pest plant introductions) will be incorporated into routine field operations. Herbicides will be used when they are the most effective method for achieving our long-term goals.

Staff and visitors will follow strict procedures to prevent the inadvertent introduction of invasive plants while working or hiking in the preserve. Our invasive species prevention protocol calls for inspecting all clothing and equipment for seeds before entering the preserve. We will remain vigilant in our search for incipient populations of invasive plants. Species such as fireweed (*Senecio madagascariensis*), Himalayan raspberry (*Rubus ellipticus*), cat's claw (*Caesalpinia decapetala*), kahili ginger (*Hedychium gardnerianum*), and plume poppy (*Bocconia frutescens*) are found nearby but do not occur on the preserve. *Miconia calvescens,* which has extensively invaded Hilo and Puna up to 3,500 ft elevation, has not been reported in Kaʻū.

Invasive species other than plants (e.g. coqui frogs, gall wasps, koa wilt, etc.) will be diligently surveyed for so that they can be detected as early as possible and responded to rapidly before they are able to gain a foothold. Rats will be controlled on a site-specific basis, as needed for the protection of rare plants.

Table 4. Known Pest Plants of Kaʻū Preserve

Common Name	Scientific Name
Christmas berry	*Schinus terebinthifolius*
Glorybush	*Tibouchina urvilleana*
Japanese anemone	*Anemone hupehensis*
Night-blooming jasmine	*Cestrum nocturnum*
Palm grass	*Setaria palmifolia*
Silk oak	*Grevillea robusta*
Strawberry guava	*Psidium cattleianum*
Common guava	*Psidium guajava*

Invasive Plant Control Program Activities

Year 1 (FY2007)

- Create priority weed maps
- Prioritize the most serious invasive weeds and geographic areas
- Develop species- and unit-specific management goals and begin adaptive management of highest priority species
- Participate as a member of the Big Island Invasive Species Committee (BIISC)
- Continue strict inspection and cleaning procedures to prevent introduction of weed species not currently in the preserve

Years 2-6 (FY2008 – FY2012)

- Maintain priority weed maps
- Monitor effectiveness of treatments
- Continue adaptive management of weeds and adjust strategies as needed based on monitoring results
- Continue to participate as a member of BIISC
- Continue strict inspection and cleaning procedures to prevent introduction of weed species not currently in the preserve

Program 3: Resource Monitoring

Program Goal: To monitor changes in the integrity of the ecosystems in and around the preserve; to determine whether critical threats to those ecosystems are increasing or decreasing; and ultimately to gauge the effectiveness of our conservation strategies.

This program represents an estimated 2% of the overall effort and budget in this long range management plan.

As an organization, The Nature Conservancy is trying to develop a more consistent and rigorous approach to evaluating the success or failure of our conservation actions. We have established a preliminary framework for assessing the effectiveness of our conservation actions based on the level of critical threats and on several key characteristics of the native ecosystems most greatly affected by them.

At Kaʻū Preserve and vicinity, we plan to monitor critical threats as above by tracking changes in: (1) ungulate activity and (2) the extent of habitat-modifying weeds. In addition to threat monitoring, we propose to track changes in five attributes of the native vegetation: (1) extent of ecosystem or community type; (2) adjacent land use patterns to native communities; (3) canopy condition; (4) understory condition; and (5) diversity of indicator plant species. In particular, we propose to measure the indicators in Table 5.

Ungulate activity levels will be measured periodically on transects as discussed previously. The number, location, and sampling scheme for these transects will be determined in Year 1. Data collected on these transects provide an index of ungulate activity and should indicate the level of success of ungulate removal efforts. In addition, field staff will also create activity maps from field observations showing the presence of ungulate sign whenever it is detected. This information will direct our ungulate removal efforts where they are needed most.

High priority invasive plant species will be mapped opportunistically during all field operations and systematically when needed. Treated populations will be monitored to determine effectiveness of treatments.

Ecosystem extent, adjacent land use patterns, and canopy condition will be assessed through analysis of aerial imagery and/or maps produced. Some of these data will be available through the Hawai‘i GAP project and some will be interpreted separately because of the coarse resolution in that effort. The frequency and precise methodology will be determined during first several years of the implementation of the management plan.

Vegetation understory and diversity will be assessed using ground-based methods. This monitoring may coincide with ungulate monitoring across landscape transects, or may entail other sampling methods. Specific sampling schemes, frequency of monitoring, and data collection methods will be determined during the first several years of the implementation of the management plan. Pilot studies at other Conservancy sites (*e.g.,* East Moloka‘i) will help to inform the development of this monitoring component.

In addition, we will continue to work with the Division of Forestry and Wildlife (DOFAW) to monitor forest birds according to the agency’s statewide schedule (i.e. every 5 years or so). The last Ka‘ū bird census was in FY2002. The bird data are maintained and analyzed by the USGS Biological Resources Division. Conservancy staff and cooperators will also document incidental observations of rare birds observed while in the preserve.

Table 5. Planned Monitoring Framework for Ka‘ū Preserve and Vicinity

Threat Factors	**Indicators**
Ungulate activity	• Frequency of ungulate sign
Extent of habitat-modifying weeds	• Extent of specific weed species
Key Vegetation Attributes	
Extent of ecosystem or natural community	• Acres of ecosystem or natural community
Adjacent land use	• Percentage of ecosystem boundary adjacent to lands managed for threat reduction or biodiversity conservation

Vegetation canopy condition	• Percentage of native canopy cover
Vegetation understory condition	• Percentage of native vegetation cover in understory • Percentage of native vegetation cover in ground layer
Diversity of indicator plant species	• Percentage and frequency of native, indicator plant species in understory and ground layer

Resource Monitoring Program Activities

Year 1 (FY2007)
- Establish ungulate monitoring transects in all four management units and establish baseline conditions
- Initiate weed mapping and establish baseline conditions of highest priority weeds
- Determine methods for monitoring efficacy of weed treatments
- Determine vegetation monitoring methodology

Year 2 (FY2008)
- Continue ungulate and weed monitoring
- Analyze threat data and adjust management actions as needed
- Determine and/or implement vegetation monitoring as necessary

Year 3 (FY2009)
- Continue ungulate and weed monitoring
- Analyze threat data and adjust management actions as needed
- Determine and/or implement vegetation monitoring as necessary
- Develop and implement a research strategy in concert with the US Geological Survey (USGS) and the University of Hawai‘i (UH)

Years 4-6 (FY2010-FY2012)
- Continue ungulate and weed monitoring
- Analyze threat data and adjust management actions as needed
- Continue vegetation monitoring as necessary
- Continue implementing a research strategy in concert with USGS and UH
- Facilitate Forest Bird Surveys, following DOFAW's schedule

Program 4: Rare Species Protection and Enhancement

Program Goal: To prevent the extirpation of rare species in the preserve, and to encourage research, predator control, and captive propagation of rare plant and bird species.

This program represents an estimated 9% of the overall effort and budget in this long range management plan.

To date, five rare plant species and two rare bird species have been observed in Kaʻū Preserve (Tables 2 and 3). The Nature Conservancy uses data compiled by the Hawaiʻi Natural Heritage Program to identify rare taxa and uses its definition of rare: "species that exist in fewer than 20 populations worldwide." Additional rare species reported from adjacent lands and similar habitats are likely to be found in Kaʻū Preserve with future surveys.

Protecting ecosystems essential to the majority of the preserve's native plants and animals will be our primary management strategy. Our ungulate and weed control programs are integral to the protection of these ecosystems and rare species. In addition, we will supplement our understanding of the types and ranges of rare plants and animals with surveys to locate other rare species and assess their status, and to document all incidental observations of rare plants, birds, bats, and invertebrates while in the preserve. We will encourage research and provide logistical support to partners interested in specific rare species research and protection efforts.

Rare plant surveys will be conducted by subcontract in Years 1 & 2. Rare species protocols will be implemented, including: securing seed collection permits, working with the Volcano Rare Plant Nursery to deliver any seeds collected for future use (either by TNC or by the State for future outplanting in the same general area). A portion of the NAPP funds will be used to support the Rare Plant Nursery to offset their expenses in maintaining and propagating any collected seeds.

TNC Field Representative, Jon Giffin, has begun working with volunteers to conduct native invertebrate surveys.

Fencing will be installed as needed to protect populations of rare plants from ungulates. Rat control will be conducted as needed.

Rare Species Program Activities

Year 1 (FY2007)
- Conduct rare plant surveys in Kaiholena and Kāhilipali units
- Implement rare species protocols
- Conduct native invertebrate surveys

Year 2 (FY2008)
- Conduct rare plant surveys in Keaīwa and Kīʻolokū units
- Continue implementing rare species protocols
- Continue native invertebrate surveys

Years 3-6 (FY2009 – FY2012)
- Protect and monitor rare plant populations

- Rare plant enhancement plans may include small exclosure fences of less than 10 acres around endangered species (see Ungulate Program for fence specifications)

Program 5: Community Outreach

Program Goal: To build Kaʻū community understanding and support for the preservation of Kaʻū's native forests, and enlist volunteer assistance for preserve management.

This program represents an estimated 15% of the overall effort and budget in this long range management plan.

The main objective of our outreach program is to increase awareness of Kaʻū Preserve, the Kaʻū watershed and native ecosystems, their importance, threats, and efforts to protect them. More specifically, we seek to encourage and facilitate active participation and community pride among the residents of the Kaʻū District in the effective conservation of this special resource. The key strategies for our public outreach work include a wide variety of programs, including: environmental education, summer intern and youth employment, volunteer, guided trips, community meetings, and hiking and hunting programs, and we will explore the possibilities of campsites.

An important focus will be on the children of Kaʻū (elementary and high school), the adults of the community, and community leaders. Preliminary discussions with principals and teachers at Pāhala and Naʻalehu schools have occurred and strategies to implement on-site educational programs are being explored. An interpretive nature trail is being developed in the Kaiholena unit. Field activities will combine a mix of conservation projects and educational opportunities. Conservation projects will include trail construction and maintenance, invasive plant control, fencing, creation of demonstration plots, and biological monitoring. Educational activities will address a wide variety of land management, cultural history, and natural history topics.

Community Outreach Program Activities

Year 1 (FY2007)
- Initiate a community outreach and volunteer program

Year 2 (FY2008)
- Continue community outreach and volunteer program
- Implement community-based environmental education program at Kaiholena

Years 3-6 (FY2009 – FY2012)
- Continue community outreach and volunteer program
- Continue community-based environmental education program at Kaiholena
- Expand the environmental education program to other Conservancy parcels and to other landowners in the region

Program 6: Watershed Partnership

Program Goal: To assist the long-term effective management of the native ecosystems of the Kaʻū region by participating in the Three Mountain Alliance, a coordinated partnership of landowners and other partners.

The ʻŌlaʻa-Kīlauea Conservation Partnership recently expanded to nearly 900,000 acres and is now known as the Three Mountain Partnership. With the recent acquisition of the Kahuku Ranch, four landowners are responsible for managing nearly 250,000 acres of contiguous lands in the Kaʻū region (the National Park Service, the State of Hawaiʻi, The Nature Conservancy, and Kamehameha Schools). These landowners and additional partners (*e.g.,* U.S. Geological Survey, U.S. Forest Service, U.S. Fish and Wildlife Service,), have initiated discussions about the need for a coordinated approach to information gathering, management planning, and community outreach. By participating in a watershed partnership, the Conservancy is reducing the threats to Kaʻū Preserve while leveraging funding by having partners.

The top three landscape scale management issues chosen by the Alliance to coordinate efforts on first are: feral cattle, fire, and weeds. A proposal for funding the development of a weed management plan has been submitted to the National Fish and Wildlife Foundation. Discussions about strategic ungulate fencing across the landscape have been initiated.

The Three Mountain Alliance Fire Working Group met on October 20, 2005. It was agreed that instead of developing a separate Fire Working Group for the Alliance, it would be better to join and participate with the Big Island Wildfire Coordinating Group (BIGWIG) and to encourage other landowners to participate. This is a better venue for communication because fire response agencies are all represented, including DOFAW and the County of Hawaiʻi. TNC will be presenting fire planning information to BIGWIG at a future meeting. It was further stressed that fire pre-suppression planning is the most important Alliance role, including: identifying high priority areas and access routes, mapping fuels/fire history, implementing fuels reduction projects, conducting community awareness/education, and assisting landowners with development of fire plans.

Some additional coordinated activities being undertaken by the Three Mountain Alliance are to:

- Define a planning boundary for the watershed partnership,
- Map the physical features and land ownership in the region,
- Determine the need/opportunity for additional partners,
- Develop and sign a Memorandum of Agreement,
- Develop a conservation or watershed management plan,
- Identify and assess primary threats to biological and cultural resources, and
- Initiate a coordinated community outreach program to identify issues and concerns relating to resource management and public use opportunities within the project area.

Funding for these and other coordinated activities, as well as funding for a fulltime TNC Field Representative position for Kaʻū will be secured through other, more appropriate, programs such as the Watershed Partnership Program, rather than the NAPP. Therefore we are not requesting any funding for our Alliance participation in this NAPP request.

As mentioned in the Ungulate Control Program description above, TNC also intends to increase public access to allow for public hunting. In support of the overall regional management, there would also be increased access to Kaʻū for DOFAW management of the Kaʻū Forest Reserve (e.g. access along the roads to the base of Puʻu One (Kaiholena unit), and access through the Kīʻolokū and Kāhilipali units along the Mountain House Trail.

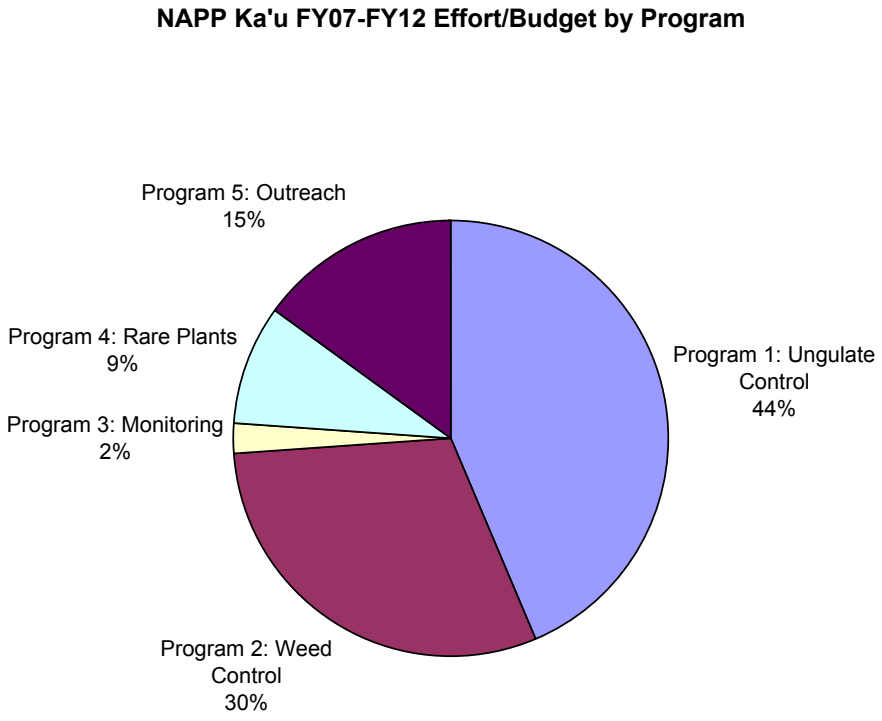
Watershed Partnership Program Activities

Year 1 (FY2007)

- Continue to help facilitate the development of the Three Mountain Alliance

Year 2 – 6 (FY2008 – FY2012)

- Support priority management activities developed by the Three Mountain Alliance



BUDGET SUMMARY

The following summary and table summarize the six-year budget for Kaʻū Preserve. Through the NAP program, the state pays two-thirds of the management costs outlined in this long-range plan.

Personnel:
This NAPP request will cover a portion of the costs of the Hawaiʻi Island Program staff that will have responsibilities in implementing the management plan. One or two seasonal interns may be hired to assist in implementing the community outreach and environmental education programs in Kaʻū as the budget allows and project needs warrant.

The Personnel line item includes:
A combined effort of Hawai'i Island Program staff equal to 2.5 FTE.

The Nature Conservancy's currently negotiated (annually with our federal cognizant agency) fringe benefit rate will accrue on all salary/wage costs. The FY07 negotiated rate is 40% for all regular staff and 12% for all temporary staff. These rates are subject to slight change each year.

Technical and annual planning support is also provided by the Honolulu office of the Conservancy. In particular, the Conservation Programs Director, Conservation Programs Coordinator, Conservation Planner, Senior Scientist, and other island resource staff help prepare

annual plans and reports, develop and implement monitoring and research programs, and establish interpretive and intern programs at the preserve. As budget and needs allow, these support staff members may charge a small portion of their time to this project

Supplies and Equipment:
FY07:
Various office and project related supplies and expenses: $13,000
One computer: $1,500
25% of one vehicle: $10,000
FY08:
Various office and project related supplies and expenses: $11,000
FY09:
Various office and project related supplies and expenses: $18,300
FY10:
Various office and project related supplies and expenses: $18,000
One computer: $1,500
25% of one vehicle: $10,000
FY11:
Various office and project related supplies and expenses: $18,000
FY12:
Various office and project related supplies and expenses: $18,000

Travel:
A travel budget of $4,000 has been budgeted each year to cover staff inter-island travel for workshops, training, staff meetings; one mainland trip for 1 staff member to attend a workshop, and mileage.
Additional funds for travel have been budgeted each year to cover helicopter expenses as follows:
FY07 - $15,500
FY08 - $17,500
FY09 - $14,000
FY10 - $13,500
FY11 - $13,500
FY12 - $13,500

Subcontracts:
$3,000 for a Rare Plant Survey subcontract has been budgeted in the first two years of this contract (FY07 and FY08).

Other:
$5,000 has been budgeted each year to cover miscellaneous project related expenses like communications, printing and photo, training fees, and insurance.

Overhead:
The allowable overhead rate of 10% on NAPP projects has been included on all costs.

Budget Table

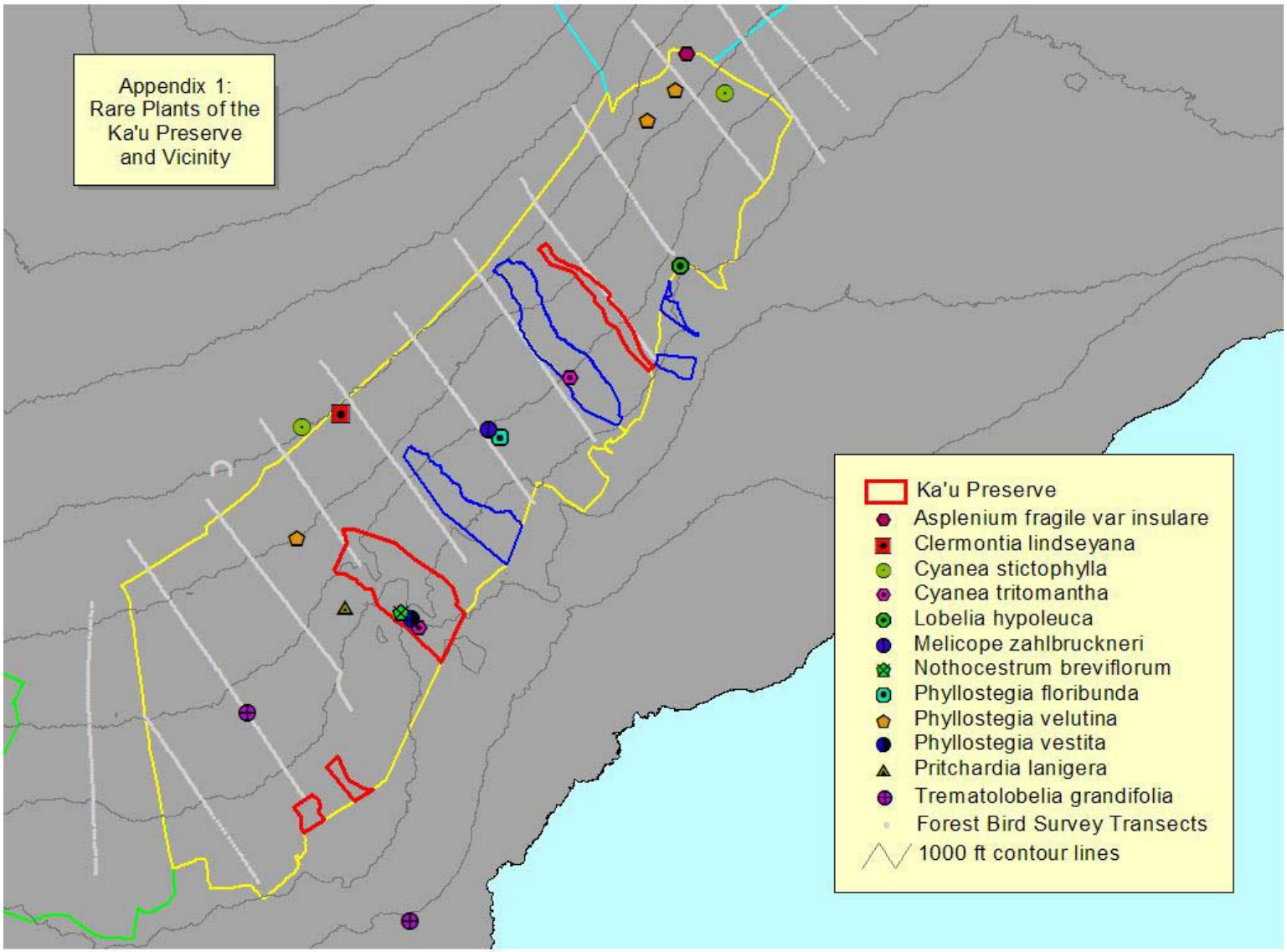
Ka'u NAPP							
	FY2007	**FY2008**	**FY2009**	**FY2010**	**FY2011**	**FY2012**	**TOTAL**
Labor and Fringe	112,972	117,483	122,214	127,097	132,172	137,445	749,384
Supplies/Equipment	24,500	11,000	18,300	29,500	18,000	18,000	119,300
Travel (includes helicopter)	19,500	31,000	18,000	17,500	17,500	17,500	121,000
Subcontracts	3,000	3,000	-	-	-	-	6,000
Other	5,000	5,000	5,000	5,000	5,000	5,000	30,000
Subtotal	164,972	167,483	163,514	179,097	172,672	177,945	1,025,684
Overhead	16,497	16,748	16,351	17,910	17,267	17,794	102,568
TOTAL	181,469	184,231	179,866	197,007	189,940	195,739	1,128,252
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
Ka'u Budget	181,469	184,231	179,866	197,007	189,940	195,739	1,128,252
Private Match (1/3 of total)	60,490	61,410	59,955	65,669	63,313	65,246	376,084
TOTAL NAPP REQUEST (2/3)	120,979	122,821	119,911	131,338	126,626	130,493	752,168

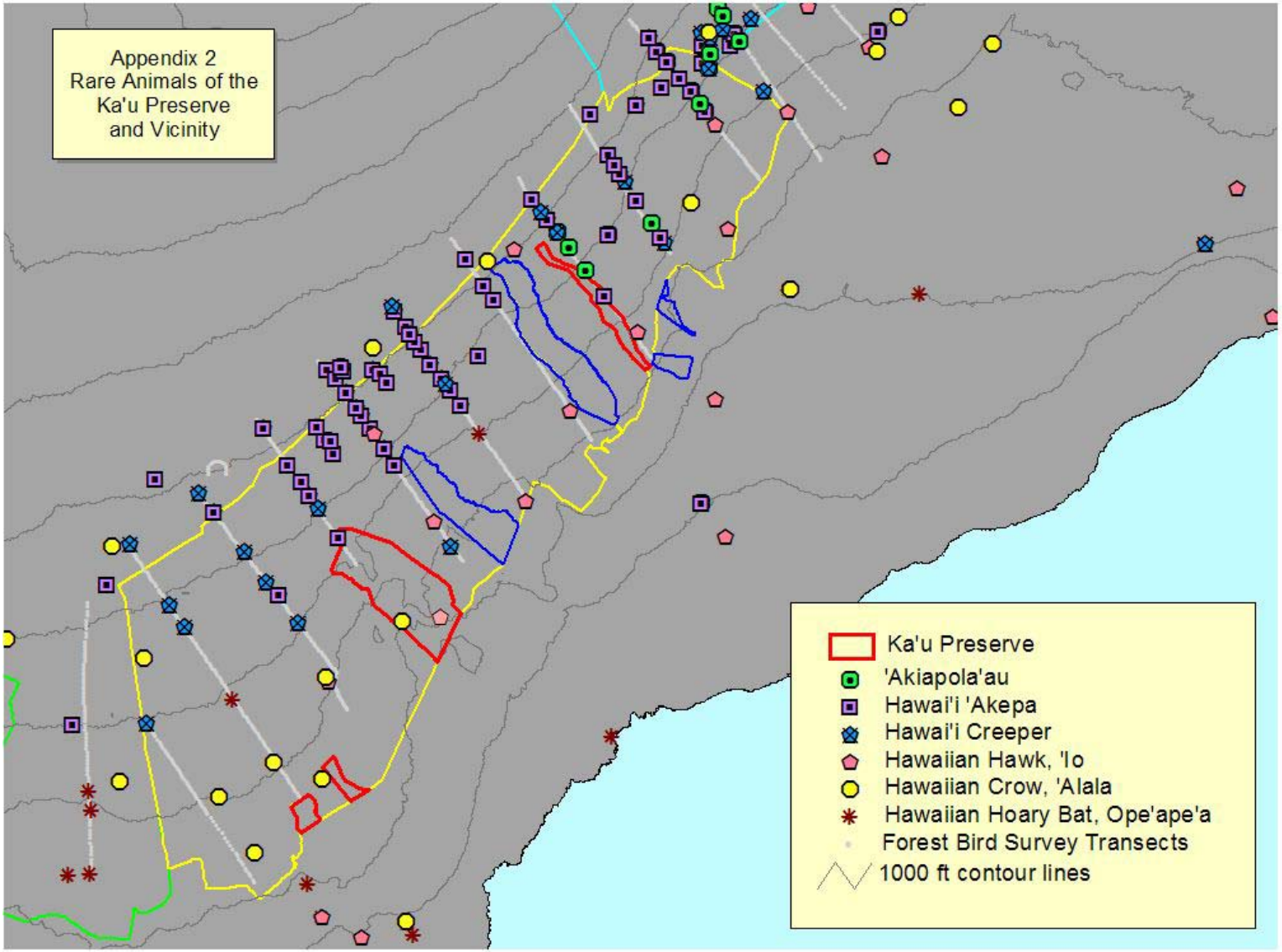
Appendix 1. Draft List of Native Plants of the Kaiholena Unit

Scientific Name	Hawaiian / Common Name
Adenophorus tripinnatifidus	Wahine-Noho-Mauna
Alyxia oliviformis	Maile
Antidesma platphyllum	Akole
Asplenium contiguum	N/A
Asplenium lobulatum	Pi'i-Lau-Manamana
Asplenium unilaterale	Pamoho
Astelia menziesiana	Pa'inui
Athyrium microphyllum	Akole
Broussaisia arguta	Kanawau
Cheirodendron trygynum	Olapa
Cibotium glaucom	Hapu'u Pulu
Cibotium hawaiense	Hapu'u Meu
Cibotium menziesii	Hapu'u 'I'i
Clermontia hawaiiensis	Oha Kepau
Clermontia montis-loa	Oha Wai
Clermontia parviflora	Oha Wai
Cocculus trilobus	Huehue
Coniogramme pilosa	Lo'olu (Fern)
Coprosma ochracea	Pilo
Coprosma rhynchocarpa	Pilo
Cyrtandra lysiosepala	Ha'iwale
Cyrtandra platyphylla	Ilihia
Dicranopteris linearis	Uluhe
Diplazium sandwichianum	Hoi'o
Dodonea viscosa	A'ali'i
Elaphoglossum crassifolium	Stag's Tongue
Elaphoglossum paleaceum	N/A
Elaphoglossum wawrae	Ekaha, Laukahi-nunui
Freycinetia arborea	Ie'ie
Grammtis hookeri	Maku'e-Lau-Li'i
Grammtis tenella	Kolokolo
Hedyotis centranthoides	N/A
Hedyotis terminalis	Manono
Huperziaserrata	Wawae'iole
Ilex anomala	Kawa'u
Korthalsella (sp?)	Hawaiian Misletoe
Labordia hedyosmifolia	Kamakahala
Lycopodiella cernua	Wawae'iole
Lycopodiella venustulum	Wawae'iole
Machaerina angustifolia	Uki
Marratia douglasii	Pala
Mecodium recurvum	Ohi'a Ku
Melicope clusiifolia	Alani
Metrosideros polymorpha	Ohi'a lehua
Microlepia strigosa	Palapalai
Myrsine lessertiana	Kolea
Nephrolepis cordifolia	Kupukupu

Appendix 1. Continued Draft Native Plant List of Kaiholena Unit

Ophioderma pendulum subsp. Falcatum	N/A
Peperomia hyopleuca	Ala'alawainui
Peperomia membranacea	Ala'alwainui
Perrottetia sandwicensis	Olomea
Pipturs albutis	Mamaki
Pittosporum confertiflorum	Ho'awa
Pittosporum hawaiiense	Ho'awa
Pneumatopteris sandwicensis	Ho'i'o-Kula
Polypodium pellucidum var. pellucidum	N/A
Psilotum complanatum	Moa
Psychotria (sp?)	Kopiko
Sadleria cyatheoides	Ama'u
Scaevola chamissoniana	Naupaka-Kuahiwi
Selaginella arbuscula	Lepelepe-A-Moa
Smilex melastomifolia	Hoi kuahiwi
Sphaerocionium lanceolatum	Palai-Hinahina
Sphenomeris chinensis	Pala'a
Trematolobelia grandifolia	N/A
Vaccinium calycinum	Ohelo Kala'au
Vandenboshcia davallioides	N/A


Appendix 1:
Rare Plants of the
Ka'u Preserve
and Vicinity
Ka'u Preserve
Asplenium fragile var insulare
Clermontia lindseyana
Cyanea stictophylla
Cyanea tritomantha
Lobelia hypoleuca
Melicope zahlbruckneri
Nothocestrum breviflorum
Phyllostegia floribunda
Phyllostegia velutina
Phyllostegia vestita
Pritchardia lanigera
Trematolobelia grandifolia
Forest Bird Survey Transects
1000 ft contour lines


Appendix 2
Rare Animals of the
Ka'u Preserve
and Vicinity
Ka'u Preserve
'Akiapola'au
Hawai'i 'Akepa
Hawai'i Creeper
Hawaiian Hawk, 'Io
Hawaiian Crow, 'Alala
Hawaiian Hoary Bat, Ope'ape'a
Forest Bird Survey Transects
1000 ft contour lines